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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. 10/759,052 | Applicant(s) LIN, TA-WEI | |
|---|---|---|---|
| | **Examiner** PETER L. CHENG | **Art Unit** 2625 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on _08 April 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) _1-4 and 6-8_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-4 and 6-8_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

**DETAILED ACTION**

1. In the Amendments to the Claims, dated **4/8/2008**, Examiner notes that **claim 1, lines 11 - 20** were also added to claim 1.

***Specification***

2. The abstract of the disclosure is objected to because:

- **Line 2:** as with changes made by applicant, suggest replacing “colorful calibration chart” with “color calibration chart”;

Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities:

- **Page 29 (**of the reply to Office Action dated 12/10/2007**), last line:** similarly, suggest replacing “correct *colorful* image” with “correct <u>color</u> image”;

- **Page 30 (**of the reply to Office Action dated 12/10/2007**), line 3:** replace “4)” with “1)”;

- **Page 30 (**of the reply to Office Action dated 12/10/2007**), line 5:** replace “5)”

with “2)”;

- **Page 30 (**of the reply to Office Action dated 12/10/2007**), line 7:** replace “6)” with “3)”;

Appropriate correction is required.

4. The amendment filed **4/8/2008** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

- **Page 28 (**of the reply to Office Action dated 12/10/2007**), lines 1 - 3:** the original disclosure on **page 7, line 5** cited,

  “Step 119: summing and averaging.”;

  however, the amended specification currently cites,

  “Step 119: summing <u>*the R.G.B. values respectively converted from the data read from the white region and the color region of the calibration chart 16,*</u> and <u>*further*</u> averaging <u>*the R.G.B. values thereof.*</u>”;

  the added material, shown underlined, is not supported by the original disclosure;

- **Page 28 (**of the reply to Office Action dated 12/10/2007**), lines 6 - 8:** the original disclosure on **page 7, line 8** cited,

  "Step 123: scanning and compensating.";

  however, the amended specification currently cites,

  "Step 123: *then the color image scanning system processes* scanning and compensating *the scanned image* <u>*referring to the summed R.G.B. value and averaged R.G.B. value.*</u>";

  the added material, shown underlined, is not supported by the original disclosure; in addition, the disclosure does not teach how the compensation uses the summed and averaged values;

Applicant is required to cancel the new matter in the reply to this Office Action.

***Claim Objections***

5. Claim 1 is objected to because of the following informalities:

- **Line 13:** per **page 28 (**of the reply to Office Action dated 12/10/2007**), line 11**, suggest replacing **an adjusted value** with <u>**a gain adjustment**</u> **value**;

- **Line 15:** per **page 28 (**of the reply to Office Action dated 12/10/2007**), line 11**, suggest replacing **the adjusted value** with **the <u>gain adjustment</u> value**;

- **Line 19:** per **page 28 (**of the reply to Office Action dated 12/10/2007**), line 20**, suggest replacing **the gain value** with **the gain <u>adjustment</u> value**;

  that is, it is the “gain adjustment value, d”, <u>and not the “gain value, g”</u>, which is “adjusted according to the difference between the maximum value and value v (i.e., the sensed pixel value)”;

- **Line 28:** “**the scanned image**” lacks antecedent basis; suggest replacing “scanning and compensating the scanned image” with “scanning <u>an image</u> and compensating the scanned image”;

- **Line 30:** regarding the amended clause, **wherein said calibration of said color image scanner is <u>*independent of a light source*</u>**, the underlined limitation (“*independent of a light source*”) would appear to be inconsistent with the disclosure since the calibration includes “scanning a white region” [**claim 1, line 3**], “scanning a color region” [**claim 1, line 21**], “determinining if a sensed pixel value in the predetermined region” [**claim 1, lines 17 - 18**] and

one of ordinary skill in the art at the time the invention was made would assume that a "light source" would be necessary for these procedures;

6. Claim 2 is objected to because of the following informalities:

- **Lines 1 - 2:** suggest replacing "the first or second data" with "the first <u>data of the white region</u> or <u>the</u> second data <u>of the color region</u>";

7. Claim 3 is objected to because of the following informalities:

- **Lines 1 - 3:** suggest replacing "wherein the first or second data of the white region or color region, respectively, is converted to the digital first or second R.G.B. value by using an analog/digital converter (A/D converter)"

  <u>with</u>

  "wherein the first <u>data of the white region</u> or <u>the</u> second data <u>of the color region</u> is respectively converted to the digital first <u>R.G.B. value</u> or <u>the digital</u> second R.G.B. value by using an analog<u>-to-</u>digital converter (A/D converter)";

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In **lines 25 - 26**, the underlined subject matter, "summing <u>the digital first R.G.B. value and the digital second R.G.B. value</u>, and further averaging <u>the summed digital first and second R.G.B. values</u>" was not properly described in the application as filed.

In **lines 28 - 30**, the underlined subject matter, "<u>referring to the digital summed R.G.B. values and digital averaged R.G.B. values, wherein said calibration of said color image scanner is independent of a light source</u>" was not properly described in the application as filed; in addition, the disclosure does not teach how the compensation uses the summed and averaged values.

Therefore, the above underlined limitations will not be considered in the following claim rejections.

## *Claim Rejections - 35 USC § 103*

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 1 – 4 and 6 - 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over **BUSHAW [US Patent 4,408,231]** in view of **YAMAZAKI [US Patent 6,480,625 B1]**.

As for claim 1, BUSHAW teaches a method for <u>automatically</u> calibrating a color image scanner, comprising:

**scanning a white region of a <u>color</u> calibration chart**

**[**BUSHAW teaches a method of adjusting a variable gain amplifier in a scanner, and cites, “The calibration of the lamp 10 and the variable gain amplifier 12 takes places while the CCD linear image sensor 18 is sensing reflected light from a

white reference strip 20”; **col. 2, lines 63 – 66.** BUSHAW uses a “white color” calibration chart**];**

**reading first data <u>of the white region</u>;**

**[**BUSHAW teaches that the “first data” corresponds to a “maximum white level” which is read from the white reference strip, and cites, “During calibration, gate 28 is set to pass the maximum white signal level detected by white follower 30 to the A/D converter 16. White follower 30 monitors the amplified video signal from DC restore 26 and stores the maximum white level from the time segmented video signal”; **col. 3, lines 32 - 37];**

**converting the first data <u>of the white region</u> to <u>a digital</u> first ~~R.G.B~~. value**

**[**BUSHAW refers to the maximum white level as a “white peak signal” and cites, “The white peak signal <u>after it is digitized by A/D converter 16</u> is passed to the microprocessor 14 via the input register 32”; **col. 3, lines 39 - 41];**

**amplifying a maximum value in each pixel to a predetermined region**

**[**BUSHAW cites, “With the video signal at the saturation level, processor 14 controls the digital variable gain amplifier to adjust the 100% video signal <u>to 100% range of the A-D converter 16</u>”; **col. 6, lines 15 - 18];**

**adjusting gain <u>of an optic mechanical module,</u>**

**[**When sensing the “white peak signal”, BUSHAW teaches a method of incrementally adjusting the variable gain amplifier until the converted analog-to-digital value reaches the “100% range of the A-D converter”; **col. 6, lines 15 – 18.** During this adjustment process, “microprocessor 14 tracks the gain of the amplifier 12 by storing a software gain DAC value at the same time it outputs an identical hardware gain DAC value to gain register 24. Thus, the incrementing operation is performed by microprocessor 14 by incrementing the software gain value and updating the hardware gain value in gain register 24”; **col. 10, lines 51 - 57]**

<u>**wherein the step of adjusting the gain includes the steps of:**</u>

<u>**determining if a current pixel value exceeds the maximum value;**</u>

<u>**subtracting [[an adjusted value]] *a gain adjustment value* from a current gain value when the current pixel value exceeds the maximum value**</u>

**[**BUSHAW teaches a variable gain offset determination process in **col. 9.** The currently measured pixel value corresponds to the “white follower value” (WF); **col. 9, line 65.** This pixel value is compared with the maximum value (hexadecimal 7F); in the flowchart, this step is shown as “IF WF < X’7F’”. When the pixel value is not less than this maximum value, and the gain DAC value is greater than 0 (shown as, “IF GAIN DAC > 0”), the current gain value is decremented by one (i.e., a “gain adjustment value”); **col. 10, lines 65 - 67]<u>;</u>**

**adding [[the adjusted value]] *the gain adjustment value* to the current gain value when the current pixel value is smaller than or equal to the maximum value**

**[**When the pixel value is less than the maximum value, and the gain DAC value is less than its maximum value (hexadecimal 7F; **col. 9, lines 67 – 68**; this comparison is shown in the flowchart as “IF GAIN DAC < X’7F’”), the current gain value is incremented (by a “gain adjustment value”**];**

**determining if a sensed pixel value is in the predetermined region, and adjusting [[the gain value]] *the gain adjustment value* according to a difference between the maximum value and sensed pixel value**

**[**With reference to the “VGA Gain Set” routine illustrated in **col. 9**, and as previously noted, BUSHAW teaches determining if the digitized “white follower value” (i.e., “a sensed pixel value”) is at the maximum value (hexadecimal 7F) (i.e., “in the predetermined region”), and when it is not in the predetermined region and the gain DAC value is less than its maximum value, the “gain adjustment value” is “adjusted” to a “unitary value” so that the current gain value is incremented**];**

**scanning a color region of the color calibration chart;**

**reading second data of the color region;**

**converting the second data of the color region to a digital second R.G.B. value;**

**summing ~~the digital first R.G.B. value and the digital second R.G.B. value,~~ and ~~further~~ averaging ~~the summed digital first and second R.G.B. values~~;**

**calculating an averaged compensating value for scanning;**

**and scanning and compensating ~~the scanned image referring to the digital summed R.G.B. values and digital averaged R.G.B. values, wherein said calibration of said color image scanner is independent of a light source~~.**

However, BUSHAW *does not specifically teach* “first data” being “RGB color data”. In BUSHAW’s scanner, the CCD is a single channel “linear array sensor containing 1728 useable photosensitive elements”; **col. 3, lines 3 – 4.**

A 3-channel CCD with separate linear array sensors for red, green and blue colors differs from a single-channel CCD in that it produces three times as much pixel data when compared to a single channel CCD and has red, green and blue filters for each linear array. However, the basic processing of each channel’s pixel data from an analog value to a digital value would have been similar as for a single-channel CCD. As such, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to adjust the variable gain amplifiers for a CCD containing 3 linear arrays (i.e., one for each of 3 color channels – red, green and blue) in a similar manner as taught by BUSHAW.

In addition, since BUSHAW does not teach a 3-channel CCD, BUSHAW also *does not teach* the following color correction process of

> **scanning a color region of the color calibration chart;**
>
> **reading second data of the color region;**
>
> **converting the second data of the color region to a digital second R.G.B. value;**
>
> **summing ~~the digital first R.G.B. value and the digital second R.G.B. value,~~ and ~~further~~ averaging ~~the summed digital first and second R.G.B. values~~;**
>
> **calculating an averaged compensating value for scanning;**
>
> **and scanning and compensating ~~the scanned image referring to the digital summed R.G.B. values and digital averaged R.G.B. values, wherein said calibration of said color image scanner is independent of a light source~~.**

YAMAZAKI teaches a method of calibrating a color scanner. With reference to **FIG. 6A** and **FIG. 6B**, YAMAZAKI teaches a method of creating an "input density characteristic correction parameter" [**col. 15, lines 9 – 12**] which includes the steps of

> **scanning a color region of the color calibration chart;**
>
> **reading second data of the color region;**
>
> **converting the second data of the color region to a digital second R.G.B. value**
>
> **[Fig. 6B,** step **402**; YAMAZAKI teaches a "reference original" (i.e., a "color calibration chart") that is "formed with patches of achromatic colors of various densities in the case of the reflection original scanner"; **col. 13, lines 45 – 46.** In **step 402**, the "reference original is read … and the thus read data is converted into digital image signals by the A/D converter which are subsequently sent to the density correcting subsection 50A"; **col. 14, lines 20 - 24];**
>
> **summing ~~the digital first R.G.B. value and the digital second R.G.B. value,~~ and ~~further~~ averaging ~~the summed digital first and second R.G.B. values~~;**
>
> **calculating an averaged compensating value for scanning**
>
> **[**After the reference original is read, a "statistic such as a mean value, a median value or the like of the image signal values within the preset image region is obtained (step 403)" based on the measured result; **col. 13, lines 11 – 14.**

YAMAZAKI teaches that a “reference measured value” of the “reference original” is preferably “spectral reflectance in [the] case of the reflection reference original”; **col. 13, lines 30 – 31.** As shown in **Fig. 6A** step **302**, this “reference measured value” is “stored in the storage device 58”; **col. 13, lines 66 – 67.**

YAMAZAKI further teaches that the “input density characteristic correction parameter” of the scanner is calculated by “using the reference measured value and the previously calculated statistic” in step 405 [**col. 14, lines 40 – 43**] and is “created as a 3x4 matrix which shows a correction value of each color, that is, an LUT for operating the density correction value using the matrix; **col. 15, lines 9 – 12.**

Specifically, YAMAZAKI teaches the relation between input R, G, B and output R’, G’, B’ as

$R' = LUT_R\ (f_R(R, G, B))$ [**col. 15, line 16**]

$f_R(R, G, B) = \beta_0 R + \beta_1 G + \beta_2 B + \beta_3$ [**col. 15, line 19**]

and that “similar relations are found also between G and B and G’ and B’ respectively”; **col. 15, lines 21 – 22.**

The “3x4 matrix” consists of the “β constants” of which there are 4 per color. The “input density characteristic correction parameter” corresponds to the “averaged compensating value”**];**

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of YAMAZAKI with those of BUSHAW to calibrate a “color scanner”. BUSHAW teaches an initial step of calibrating the CCD sensor and adjusting the channel signal gains to maximize the use of the range of the analog-to-digital converter. YAMAZAKI teaches a subsequent step of generating a “3x4 correction matrix” that corrects the color density values sensed by the scanner.

**and scanning and compensating ~~the scanned image referring to the digital summed R.G.B. values and digital averaged R.G.B. values, wherein said calibration of said color image scanner is independent of a light source~~.**

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the color scanner (i.e., “scanning”) and correct the density of the scanner RGB values by use of the “3x4 correction matrix ” (i.e., “compensating”).

Regarding claim 2, BUSHAW further teaches the method as claimed in claim 1, wherein

**the first or second data is accessed by using an image sensor**

**[**BUSHAW teaches that the “first data” is accessed by a “CCD linear image sensor” **18** in **Fig. 1].**

Regarding claim 3, BUSHAW further teaches the method as claimed in claim 1, wherein

**the first <u>or</u> second data <u>of the white region or color region, respectively,</u> is converted to the <u>digital</u> first <u>or</u> second ~~R.G.B~~. value by using an analog / digital converter (A/D converter)**

**[**BUSHAW teaches the conversion of “first data” by an “analog-to-digital converter” **16** in **Fig. 1.** As noted for claim 1, BUSHAW does not specifically teach that “first data” is “RGB color data”. However, as previously noted, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply an analog-to-digital converter to the separate red, green and blue channels in the same manner as for a single-channel sensor.**].**

Regarding claim 4, BUSHAW *does not specifically teach* the method as claimed in claim 1, wherein

**the pixel is represented by 8 bits and the maximum value is set within 250-255**

**[**BUSHAW’s analog-to-digital converter has 7 bits instead of 8 bits. BUSHAW cites, “There are 128 levels in the A-D converter 16. Thus, the hexadecimal 7F represents the <u>maximum value</u> from A-D converter 16”; **col. 9, lines 62 – 64.**

Applicant's requirement of an 8-bit digital value and a maximum within 250 – 255 is a design choice. With a 7-bit analog-to-digital converter, BUSHAW teaches the same concept as taught by the applicant. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply BUSHAW's teachings to an 8-bit converter by setting the maximum value to be 255**].**

Regarding claim 6, BUSHAW *does not specifically teach* the method as claimed in claim 1, wherein the step of calculating <u>the</u> averaged compensating value is performed by using a relation between a <u>sensed</u> ~~sensing~~ value (R, G, B) and a real value (r, g, b), the relation is:

**$R = a_{11} * r + a_{12} * g + a_{13} * b + C_1$ ....... (1)**

**$G = a_{21} * r + a_{22} * g + a_{23} * b + C_2$ ....... (2)**

**$B = a_{31} * r + a_{32} * g + a_{33} * b + C_3$ ....... (3)**

**wherein $a_{IJ}$ ( i, j = 1, 2, 3 ) are relative coefficients between the <u>sensed</u> ~~sensing~~ value and real value<u>, and</u> $C_1$, $C_2$, $C_3$ are minimum values of the <u>sensed</u> ~~sensing~~ value.**

However, as noted for claim 1, YAMAZAKI teaches a "3x4 correction matrix" that relates input R, G, B (or "sensed" – R, G, B) with output R', G', B' (or "real" – r, g, b); using YAMAZAKI's notation:

$$R' = \beta_{0R}R + \beta_{1R}G + \beta_{2R}B + \beta_{3R}$$

$$G' = \beta_{0G}R + \beta_{1G}G + \beta_{2G}B + \beta_{3G}$$

$$B' = \beta_{0B}R + \beta_{1B}G + \beta_{2B}B + \beta_{3B}$$

In matrix notation,

$$[R', G', B']^T = [X]\,[R, G, B, 1]^T$$

where [X] is the 3x4 correction matrix. This relation may be expressed in an alternate form,

$$[R', G', B']^T = [Y]\,[R, G, B]^T + [Z]$$

where [Y] is a 3x3 correction matrix and [Z] is the 3x1 matrix $[\beta_{3R}, \beta_{3G}, \beta_{3B}]^T$. Solving for input (or "sensed") R, G, B

$$[R, G, B]^T = [Y]^{-1}\,[R', G', B']^T - [Y]^{-1}\,[Z]$$

where $[Y]^{-1}$ is the matrix inverse of [Y].

Using the instant application's notation for "real RGB values" (r, g, b) in place of (R', G', B') yields

$$[R, G, B]^T = [Y]^{-1}\,[r, g, b]^T - [Y]^{-1}\,[Z]$$

As shown, when the "actual" or "real" RGB values $[r, g, b]^T$ are $[0, 0, 0]^T$ (corresponding to a black color), the "input" or "sensed" RGB values $[R, G, B]^T$ are equal to $(-[Y]^{-1}\,[Z])$

which are “minimum values of the sensed values”. That is, $(-[Y]^{-1}[Z])$ corresponds to the instant application’s $[C_1, C_2, C_3]^T$.

Regarding claim 7, BUSHAW *does not specifically teach* the method as claimed in claim 6, wherein the equations (1) - (3) are expressed via matrices as following:

**$[R, G, B]^T = A [r, g, b]^T + C$ ....... (4)**

**wherein matrices A and C are written as:**

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \quad C = \begin{bmatrix} c_1 \\ c_2 \\ c_3 \end{bmatrix}.$$

Equation (4) above is simply the *equivalent* matrix notation of equations (1) to (3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to re-write equations (1) to (3) in matrix notation as this format is typically used to solve simultaneous equations.

Regarding claim 8, BUSHAW *does not specifically teach* the method as claimed in claim 7, wherein the step of scanning and compensating is performed by using an inverse ~~reverse~~ function of equation (4) as:

**$[r, g, b]^T = A^{-1} ([R, G, B]^T - C)$**

**whereby the real value (r, g, b) is obtained.**

Note that this equation is a derivation of equation (4) cited in claim 7; the difference being that the “real values” (r, g, b) are calculated by means of an inverse matrix $\mathbf{A}^{-1}$.

As noted for claim 6, YAMAZAKI teaches a relation between input R, G, B (or “sensed” – R, G, B) and output R’, G’, B’ (or “real” – r, g, b).

In matrix notation,

$$[R', G', B']^T = [X]\,[R, G, B, 1]^T$$

where [X] is the 3x4 correction matrix. This relation may be expressed in an alternate form,

$$[R', G', B']^T = [Y]\,[R, G, B]^T + [Z]$$

where [Y] is a 3x3 correction matrix and [Z] is the 3x1 matrix $[\beta_{3R}, \beta_{3G}, \beta_{3B}]^T$.

Using the instant application’s notation for “real RGB values” (r, g, b) in place of (R’, G’, B’) yields

$$[r, g, b]^T = [Y]\,[R, G, B]^T + [Z]$$

which is of the same form as claimed by the instant application.

## ***Response to Arguments***

1. Applicant's arguments filed 4/8/2008 have been fully considered but they are moot in light of the amended claims.

However, the following items regarding applicant's remarks should be noted:

- **Page 15, lines 5 - 6:** it is the "value d" (now, referred to as the "gain adjustment value") which is "adjusted (25) according to the difference between the maximum value and the sensed pixel value", and not the "gain value"; support for this can be found on **page 7, lines 22 – 25** of the original disclosure;

- **Page 16, lines 2 – 4, 13:** although BUSHAW calibrates the light source to "bring the image sensor 18 to the saturation point", BUSHAW also teaches that "*alternatively, the microprocessor could change the sampling interval for the photosensors in the array until the array saturates*"; **col. 2, lines 13 – 15.** After the light source has been calibrated or the sampling interval has been adjusted, BUSHAW teaches a procedure (VGA Gain Set) for setting the gain of the variable gain amplifier.

In a similar manner, the instant application teaches adjusting the "gain" of a "converting circuit of an optic mechanical module" with a "feedback loop so that the quality of the output color from the image scanning system can be retained" at "a predetermined level"; **page 3 (**of the original disclosure**), lines 8 – 11.** Applicant further teaches that the "converting circuit" may be an analog-to-digital converter; **page 5 (**of the original disclosure**), lines 10 – 11.**

- **Page 16, lines 14 – 21:** contrary to applicant's citation of **col. 1, lines 6 – 7** of the BUSHAW reference, BUSHAW's "VGA Gain Set" routine adjusts the gain of the variable gain amplifier by sampling a digitized value from the sensor. BUSHAW cites, "Gate 28 is set to pass the analog signal from white follower 30. Thus the signal digitized by converter 16 at C1729 time will be the maximum white level from video cells 1-1728"; **col. 9, lines 51 – 54.**

- **Page 17, lines 20 – 21:** regarding applicant's remarks that BUSHAW's gain adjustment relies on a "necessary conversion *back* from digital-to-analog in order to adjust the lamp or light source", as noted, after the light source has been calibrated or the sampling interval has been adjusted, BUSHAW teaches a procedure (VGA Gain Set) for setting the gain of the variable gain amplifier;

also, with respect to the "VGA Gain Set" routine, the "conversion *back* from digital-to-analog" is a matter of "incrementing the software gain value and updating the hardware gain value in gain register 24"; **col. 10, lines 55 – 57.** The "gain register 24" provides a digital gain value (not to be confused with the "digitized white follower" value) which has either been incremented or decremented to the variable gain amplifier which itself contains a digital-to-analog converter.

**Page 17, lines 21 – 22:** contrary to applicant's remarks that "no such incrementing and back converting is required in the subject Application", as previously noted, in a similar manner, the instant application teaches adjusting the "gain" of a "converting circuit of an optic mechanical module" with a "feedback loop so that the quality of the output color from the image scanning system can be retained" at "a predetermined level"; **page 3 (**of the original disclosure**), lines 8 – 11.** Applicant further teaches that the "converting circuit" may be an analog-to-digital converter; **page 5 (**of the original disclosure**), lines 10 – 11.**

Applicant teaches a "feedback loop" which incrementally increases or decreases the gain value. Per the original disclosure on **page 7, lines 24 – 25**, the instant application teaches "jumping back to step 21";

***Conclusion***

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter L. Cheng whose telephone number is 571-270-3007. The examiner can normally be reached on MONDAY - FRIDAY, 8:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, King Y. Poon can be reached on 571-272-7440. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/King Y. Poon/
Supervisory Patent Examiner, Art Unit 2625

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July 14, 2008